



## Ideal fit

Whether consolidating virtualized workloads or getting the most speed from database servers, DataCore dynamically optimizes access to high-performance, multi-tier storage pools. The storage virtualization software keeps high-priority activity on Fusion-io flash memory cards and lower priority blocks on conventional hard disk drives (HDDs).

It's an ideal solution to your most pressing I/O performance and availability requirements.

# Speed Up Applications, Enhance Availability, Reduce Costs

## Harnessing Fusion-io Flash Technologies

Flash memories and solid state disks (SSDs) play an instrumental role in reducing the disk latencies often responsible for mission-critical applications running poorly. These technologies excel in boosting the performance of OLTP and business intelligence workloads to name a few. Fusion-io products, in particular, are renowned for accelerating response in the most demanding data-intensive environments, either as low-latency server-side caches or as flash-based storage servers.

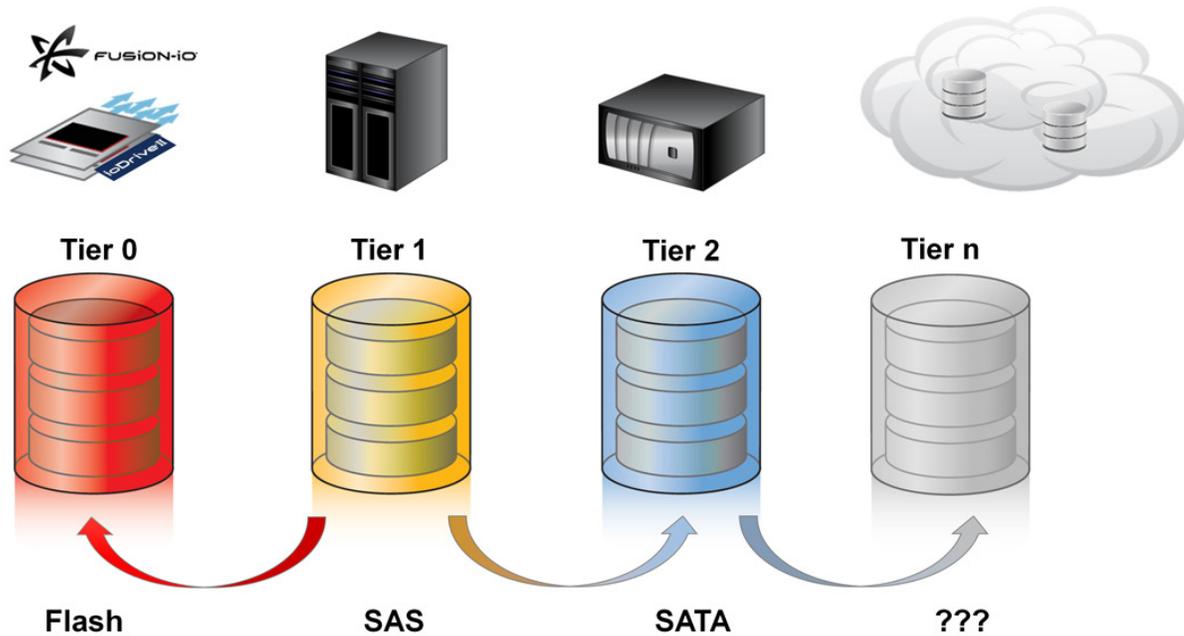
DataCore™ storage virtualization software helps you strike a balance between the blazing speed of Fusion-io flash memories (ioDrives) and the economies of larger-capacity HDDs. It does this by dynamically directing workloads where most appropriate. The combined hardware and software solution uses flash as an ultra-fast class of storage alongside conventional disks, often already in place. This novel approach helps you avoid unnecessary spending on additional disk equipment or exotic storage devices. You also get the added benefit of a fully redundant, high-availability solution for uninterrupted fast access to your data.

## Putting the right resources on the job

The remarkable speed of Fusion-io flash memories is most prized in mission critical applications requiring the fastest possible response from disk. However, more modest, high-capacity, lower cost storage technologies may be appropriate for other workloads, including some threads of data-intensive applications. The challenge comes when trying to determine in real time which competing requests should take advantage of these very valuable resources while preventing lower priority requests from unintentionally tying up precious flash capacity.

The DataCore™ SANsymphony™-V storage hypervisor makes those dynamic decisions intelligently using a technique called automated storage tiering. Unlike similar functions found in certain high-end intelligent storage arrays, DataCore applies auto-tiering outside the box. In other words, DataCore auto-tiers across any of the storage resources in your datacenter; those that you may have purchased in the past, as well as new technologies that you are likely to acquire in the future.

More specifically, it makes the hard choices about which disk blocks should be accessed from Fusion-io flash cards, and those best migrated to other devices in your diverse storage infrastructure.



Auto-tiering across different classes of storage

## How it works

### Dynamic auto-tiering

The DataCore software organizes the Fusion-io cards and the other available disks into a virtual storage pool. It classifies the flash memory as the top tier, and assigns less speedy, higher density drives to lower tiers based on price/performance characteristics that you set.

The software dynamically directs workloads to the most appropriate class of storage device, favoring the Tier 0 flash memory for high-priority demands needing very high-speed access. It relegates lower priority requests to fast HDDs, bulk drives or even public cloud storage. Any special, high-priority workloads can also be pinned to the ioDrives. At the same time, the software migrates less-frequently used blocks to the HDDs to avoid undesirable contention for the flash memory.

### Shared resources

The virtual pool is shared with the virtualized and physical hosts using standard SAN connections. Applications and host operating systems mount the logical volumes from the pool like they would any iSCSI and/or Fibre Channel disks. These virtual disks are thin provisioned to minimize space consumption.

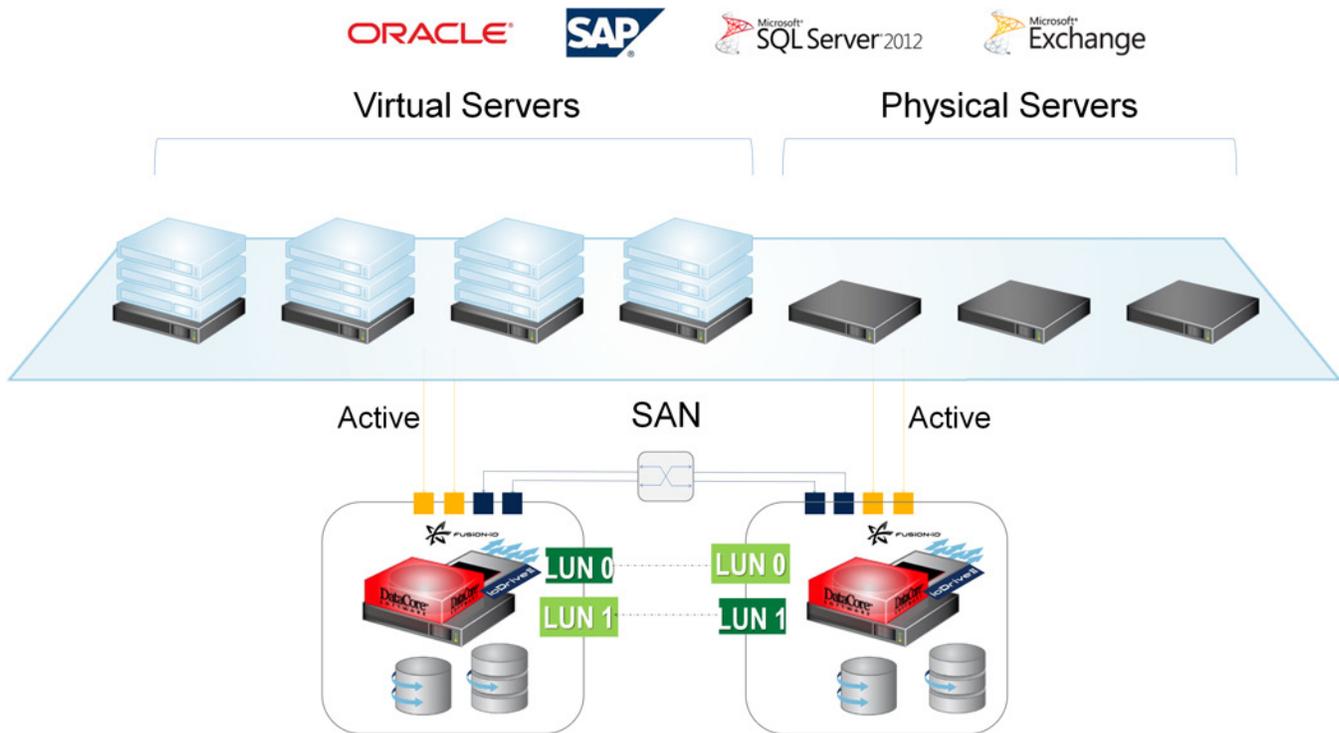
The software also speeds up access to the pool by caching disk blocks in the node's RAM. Up to 1 TB of a node's memory may be set aside for the adaptive cache, helping to hold the combined working sets for multiple mixed workloads. Read and write access to the mechanical HDDs benefits the most from SANsymphony-V adaptive caching.

### Fully redundant

To ensure continuous availability, the storage hypervisor synchronously mirrors updates written to the ioDrives and HDDs to a second, similarly-configured redundant storage pool.

Traffic is evenly spread between the two pools by equally distributing the preferred paths from the host servers across the active/active SAN.

If one of the storage pools needs to be taken out of service, or any of its devices suffers a failure, the applications are transparently redirected to the other copy without disruption. Additional safeguards may be configured by asynchronously or synchronously replicating virtual disks in the storage pool to remote disaster recovery sites, where additional ioDrives may reside inside another DataCore storage pool.



## Shared access to mirrored pools for uninterrupted high-performance applications

### Scale out as needed

The DataCore software can be set up in several ways. For midsize and larger installations, the software runs on dedicated servers sized to meet your specific IOPS, throughput and capacity requirements. The DataCore nodes effectively front-end the physical pool of storage devices. You may configure DataCore nodes from any of the standard x86/x64 Windows servers in the market. Some customers even repurpose application servers vacated after a server consolidation project.

The storage infrastructure can be easily and non-disruptively scaled out by adding DataCore nodes to keep up with growth.

The Fusion-io cards are installed on the PCI Express Bus of the nodes. The balance of direct-attached drives (DAS) and external storage arrays use their respective disk interfaces.

### Collapse for smaller requirements

In smaller scenarios where a cluster of a few virtualized servers have adequate resources, the SANsymphony-V software can co-reside with the guest virtual machines (VMs) on the same physical host. In other words, the DataCore nodes share the same server hardware as the applications.

The logical order of operations follows the same behavior described earlier for external nodes.

In fact, some pilot programs start out in the collapsed form and then grow out to use dedicated nodes when more workloads are incorporated. Since the software and licenses are portable, those investments and operational skills endure.

For these configurations, the DataCore storage virtualization software creates the virtual storage pool from the local PCIe flash cards along with any internal server drives and other locally connected storage resources.

Virtual iSCSI channels internal to the host provide the logical SAN connection between the VMs and the virtual disks. External iSCSI or Fibre Channel connections between the servers handle the inter-node synchronous mirroring for high-availability.

## Benefits

Numerous benefits arise from the combination of DataCore SANsymphony-V software and Fusion-io flash memory products, especially when integrated into environments with conventional disk farms. Although, sheer speed may be your initial consideration, you are sure to appreciate the other advantages highlighted below.

### Performance

- Increases application performance up to 20x
- More concurrent users
- Quicker response times
- Elegant handling of traffic spikes
- Faster batch processing and reporting
- Dramatically improved query performance
- Faster write performance
- Allows maximum performance, minimum latency, and comprehensive visibility

### Flexibility

- Shares flash memories across multiple servers and applications automatically optimizing the system for mixed workloads

### Reliability / High-Availability

- Synchronous replication option protects against system failures
- Industry-leading enterprise flash reliability and endurance
- Additional safeguards using asynchronous replication to remote disaster recovery sites

### Manageability

- Open systems that use your trusted server and storage vendors
- Comprehensive storage virtualization suite
- GUI and PowerShell management; SNMP integration, and performance monitoring

### Value

- Strikes affordable balance between performance and budget
- Shares flash memories across multiple servers and applications
- Dynamically auto-tiers data across block devices with different performance characteristics
- Keeps high-priority activity on flash memory and archival or low priority data on HDDs
- Thin provisions disk space to maximize utilization of capacity



For additional information, please visit [www.datacore.com](http://www.datacore.com) or email [info@datacore.com](mailto:info@datacore.com)

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